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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/587,069	07/21/2006	Naoko Sawatari	CU-4970 RJS	6953

26530 7590 04/30/2008

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EXAMINER	
HON, SOW FUN	

ART UNIT	PAPER NUMBER
1794	

MAIL DATE	DELIVERY MODE
04/30/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/587,069	SAWATARI ET AL.	
	Examiner	Art Unit	
	SOPHIE HON	1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *2/01/08, 2/19/08*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *11-20 and 23-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *11-20,23-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *3/31/08,2/08/08*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

Rejections Withdrawn

1. The obviousness-type double patenting rejection of claims 11-28 over claims 1-5, 10-14 of copending application no. 11/039,278 is withdrawn due to Applicant's terminal disclaimer filed 02/01/08.

2. The obviousness-type double patenting rejection of claims 11, 19, 21, 23, 25, 27 over claims 12, 19, 21, 23, 25, 27 of copending application 10/587,140 is withdrawn due to Applicant's terminal disclaimer filed 02/01/08.

3. The objection to claims 15-16 is withdrawn due to Applicant's amendment filed 02/01/08.

4. The 35 U.S.C. 102(b) and 103(a) rejections of claims 11-28 over Gibbons as the primary reference are withdrawn due to Applicant's amendment filed 02/01/08.

New Rejections

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

5. Claims 11-20, 23-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gibbons (US 2003/0232930 A1) in view of Yamazaki (US 2003/0058210 A1).

Regarding claim 11, 23, Gibbons teaches a liquid crystal display (abstract), wherein the liquid crystal display comprises a ferroelectric liquid crystal sandwiched

between two substrates (cell, [0185]), wherein an electrode and a photoalignment film are each successively formed on opposite faces of the substrates facing each other (electrodes 2 on substrates 1, and optical alignment layers 3 formed thereon, cell, Fig.1, [0086]). Gibbons teaches that a constituent material of the respective photoalignment layer is a photoreactive material which generates a photoreaction to give anisotropy to the photoalignment film (capable of dimerization upon optical alignment, [0040]). Gibbons teaches that the constituent material of the respective photoalignment layer can have a different composition from each other (the pair of substrates can contain optical alignment layers, the second alignment layer comprising the same or a different polymer [0082]) with the ferroelectric liquid crystal sandwiched therebetween. Gibbons is silent regarding the phase characteristics of the ferroelectric liquid crystal, and thus fails to disclose that it does not have a smectic A phase in a phase series thereof, or that it constitutes a single phase.

However, Yamazaki teaches that when a monostable ferroelectric liquid crystal that does not have a smectic A phase in a phase series thereof (electrooptic characteristic of monostable FLC that exhibits isotropic-cholesteric-chiral smectic C phase transition, [0158]) is used in a liquid crystal display, it produces a half V-shaped switching mode, for the purpose of providing a display with low voltage driving and gray scale capability (such electrooptical characteristic, [0159]).

Therefore, since Gibbons is silent regarding the phase characteristics of the ferroelectric liquid crystal, it would have been necessary and hence obvious to have looked to the prior art for suitable types. As such, it would have been obvious to one of

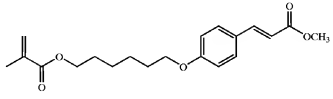
ordinary skill in the art at the time the invention was made, to have used a monostable ferroelectric liquid crystal that does not have a smectic A phase in a phase series thereof, as the ferroelectric liquid crystal in the liquid crystal display of Gibbons, in order to provide a liquid crystal display with low voltage driving and gray scale capability, as taught by Yamazaki.

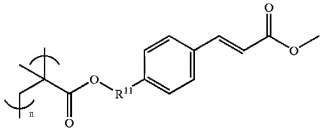
Regarding claim 12, Gibbons teaches that the photoreaction is an optical dimerization reaction (capable of dimerization upon optical alignment, [0040]).

Regarding claims 13-16, Gibbons teaches that the photoreactive material comprises a dimerization-reactive polymer (functionalized addition polymers containing photoreactive groups capable of dimerization upon optical alignment, [0040]) wherein the photoreactive group is contained in its side chain, and is any one of cinnamic acid ester (cinnamate, [0040], Table 3, 1st and 4th addition monomers, [0041]), which is a species of an optically dimerization-reactive compound having a radical-polymerizable functional group and dichroism that different absorptivities are exhibited in accordance with a polarization direction thereof.

Regarding claims 17-18, Gibbons teaches that the addition monomer shown on the next page, is an optically dimerization-reactive compound (addition monomer containing photoreactive groups capable of dimerization upon optical alignment, [0040]), which polymerizes by addition through the terminal double bond to form the corresponding dimerization-reactive polymer of Applicant, shown below the addition monomer. In this case, R^{11} of Applicant is -$(CH_2)_6$-, where A^1 of Applicant = B^1 of

Applicant = covalent single bond, Z^{11} of Applicant = Z^{12} of Applicant = $-CH_2-CH_2-$, and t of Applicant =2.





Gibbons teaches that n = 5,000 [0053], which is within the claimed range of 4 to 30,000.

Regarding claims 19-20, Gibbons teaches that the ferroelectric liquid crystal layer only consists of the ferroelectric liquid crystal [0188] and does not contain any polymer network. Thus the ferroelectric liquid crystal is a liquid crystal which constitutes a single phase as defined in Applicant's specification (page 31).

Regarding claim 24, Yamazaki teaches that when a monostable ferroelectric liquid crystal that does not have a smectic A phase in a phase series thereof (electrooptic characteristic of monostable FLC that exhibits isotropic-cholesteric-chiral smectic C phase transition, [0158]) is used in a liquid crystal display, it produces a half V-shaped switching mode, for the purpose of providing a display with low voltage driving and gray scale capability (such electrooptical characteristic, [0159]).

Regarding claims 25-26, Gibbons teaches that the liquid crystal display is driven by an active matrix system using thin film transistors (active elements such as thin film transistors, [0086], active matrix liquid crystal display, [0168]).

Regarding claims 27-28, while Gibbons teaches that the liquid crystal display can be a color one ([color filter, [0086]), Gibbons is silent regarding the type of color system driver, and thus fails to teach that the liquid crystal display is driven by a field sequential color system.

However, Yamazaki teaches that a liquid crystal display driven by a field sequential color system ([0157]) provides very high color resolution and reduced flicker of image (abstract, three times resolution of conventional color display, [0011]).

Therefore, since Gibbons is silent regarding the type of color system driver, it would have been necessary and hence obvious to have looked to the prior art for suitable types. As such, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used a field sequential color system to drive the color liquid crystal display of Gibbons, in order to provide very high color display resolution, as taught by Yamazaki.

Response to Arguments

6. Applicant's arguments regarding the valid combination of Gibbons in view of Yamazaki have been fully considered but they are not persuasive.

7. Applicant argues that in stating that "the pair or substrates can both contain optical alignment layers or a conventional alignment layer (e.g. mechanically buffed) can be used as the second alignment layer comprising the same or a different polymer" ([0082]), Gibbons is not teaching that the constituent material of the respective photo alignment layer has a different composition from each other, but rather is teaching that (q) optical alignment layers can be formed on the pair of substrates, or alternatively, an optical alignment layer can be formed on one of the substrates and a conventional alignment layer (such as rubbing layer) can be used as the second alignment layer comprising the above-mentioned hybrid polymer or a different polymer. Applicant adds that Example 19 of Gibbons displays the same kind of hybrid polymer used in the two optical alignment layers, and thus Gibbons is completely silent regarding the use of different polymers for the respective two optical alignment layers.

Applicant is respectfully apprised that the interpretation by Applicant of the statement by Gibbons is a narrower one than the interpretation by the Office. Applicant is respectfully directed to the fact that Gibbons does not specify that the optical alignment layers comprise the same polymer, and that the last line of the statement "comprising the same or a different polymer" is logically applied to the optical alignment layers as well as the conventional alignment layer without any contradiction. In fact, Gibbons teaches different polymers, and states that each optical alignment layer is

prepared from at least one hybrid polymer (page 29), which fully enables the embodiment of two photoalignment layers with different compositions that is presented in Gibbon's statement.

8. Applicant argues that while Yamazaki does disclose a ferroelectric liquid crystal which exhibits mono-stability and no smectic A phase in its phase series, the reference does not disclose anything related to the orientation defects of the liquid crystal which Applicant claims is an important feature in Applicant's invention since such a phase series easily generates orientation defects such as double domains in the absence of a smectic A phase.

Applicant is respectfully apprised that the primary reference Gibbons is silent regarding the phase series of the ferroelectric liquid crystal and that therefore it would have been necessary and hence obvious to have looked to the prior art for suitable types. Applicant is correct in stating that Yamazaki does not disclose anything related to the orientation defects of the ferroelectric liquid crystal which exhibits mono-stability and no smectic A phase in its phase series. In fact, Yamazaki actually teaches that such a liquid crystal produces a half V-shaped switching mode which provides a low voltage driving and gray scale display (such electrooptical characteristic, [0159]), which Yamazaki teaches is highly desirable. In addition, Yamazaki teaches that such a liquid crystal is used in a liquid crystal display that is driven by a field sequential color system ([0157-0158]).

Applicant is respectfully apprised that Applicant has not provided data demonstrating that the use of a ferroelectric liquid crystal having no smectic A phase in

a phase series thereof is indeed not useful in a liquid crystal display that is driven by a field sequential color system unless the two alignment layers are photoalignment ones with different compositions.

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication should be directed to Sow-Fun Hon whose telephone number is (571)272-1492. The examiner can normally be reached Monday to Friday from 10:00 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Keith Hendricks, can be reached on (571)272-1401. The fax phone number for the organization where this application or proceeding is assigned is (571)273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Sophie Hon/

Sow-Fun Hon

/KEITH D. HENDRICKS/
Supervisory Patent Examiner, Art Unit 1794